

REMARKS

Re-examination and reconsideration of the rejections are hereby requested.

Claims 1-8 are pending in this application. Claims 1 and 2 stand rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 3,947,689 to Wagner, and claims 3 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner. Claims 4-5 and 7-8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner in view of U. S. Patent No. 3,904,818 to Kovac. Claim 1 is being amended herein and the remaining claims remain unchanged.

The present invention is a high quantum efficiency point light detector. Because of the high quantum efficiency, the detector of the invention can be used in low signal-to-noise ratio situations such as responding to fluorescing molecules tagged to molecules of interest. As discussed in the specification, photomultiplier tubes (PMT's) are often used as such a detector, although the quantum efficiency of PMT's is low. While detectors that measure electric charges generated by incident radiation such as charge-coupled devices (CCD's) are known to have a much higher quantum efficiency than PMT's, it was assumed that the PMT was the best solution available for use as a point detector. This was believed to be the case because CCD's, though having higher quantum efficiency, suffer from dark current-related electron shot noise and especially from readout noise.

As further described in the specification, the present invention recognizes that detectors that measure electric charges generated by incident radiation (such as a CCD detector) can be modified into a point detector that can achieve a high signal-to-noise ratio. One such modification is that the detector has a cell size comparable to the light beam area of the incident radiation. The single independent claim 1 has been amended herein to recite that the detector measures electric charges generated by the light beam. Support for this amended language may be found in the specification at the last line on page 1 and the first two lines on page 2 of the specification where it is stated that: "The detector may be any detector that measures electric charges generated by incident radiation such as a charge-coupled device (CCD)." For the reasons to be discussed hereinbelow, it is submitted that claim 1, and claims 2-8 that depend from claim 1, are free of the prior art and allowable.

As stated above, claim 1 has been rejected as being anticipated by U. S. Patent No. 3,947,689 to Wagner. In one embodiment, Wagner discloses a radiographic system having a radiation source and an image receptor in which the beam has a cross-sectional size that conforms accurately to the size of the image receptor. The patent teaches that the image receptor may either be an image intensifier or film. In neither case does such a detector measure electric charges generated by the radiation.

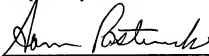
As described by Wagner, an image intensifier tube is a device in which the incident x-ray image is converted to an equivalent electron image and the electron image is electrostatically accelerated and focused onto an output screen assembly that converts the accelerated electron image into a bright, visible image. The examiner's attention is directed to Wagner at column 5, lines 18-37. An image intensifier tube does not measure electric charges generated by the incident radiation as now required in amended claim 1.

Therefore, claim 1 is not anticipated by the Wagner reference and is allowable. Nor would any of the art of record have suggested using a detector that measures electric charges generated by the incident radiation because, as discussed in the specification, such detectors suffer from dark current-related electron shot noise and especially from readout noise.

In view of the foregoing remarks with respect to the single independent claim 1, it is submitted that the rejections of the dependent claims are moot and that these dependent claims are allowable in that all of the dependent claims ultimately depend from claim 1.

It is thus submitted that pending claims 1-8 are in condition for allowance, and early favorable action is requested.

Respectfully submitted,



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Dated: August 12, 2003